



# Tucson Electric Power

## Energy Efficiency Implementation Plan

### Solar 101

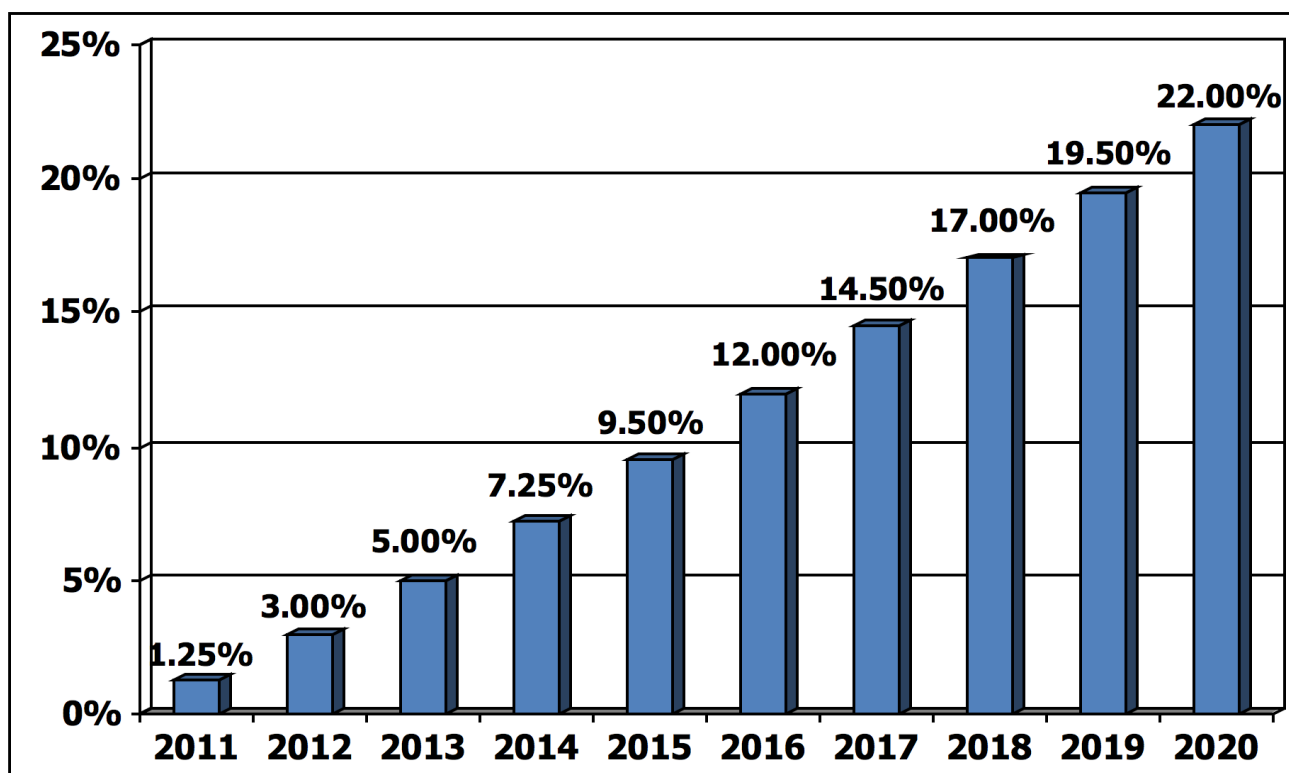
February 23, 2011

# Agenda

- Introduction / Overview
- Commercial Programs
- Residential Programs
- Questions????

# AZ Energy Efficiency Standard

Cumulative Annual Energy Savings as a % of Retail Sales-  
22% Over 10 Years



## Annual Savings Goals/Yr

|       |      |
|-------|------|
| 1.25% | 2011 |
| 1.75% | 2012 |
| 2%    | 2013 |
| 2.25% | 2014 |
| 2.25% | 2015 |
| 2.5%  | 2016 |
| 2.5%  | 2017 |
| 2.5%  | 2018 |
| 2.5%  | 2019 |
| 2.5%  | 2020 |

# Why Energy Efficiency?

When we meet our goals, we will have saved enough energy to power

18,000 x

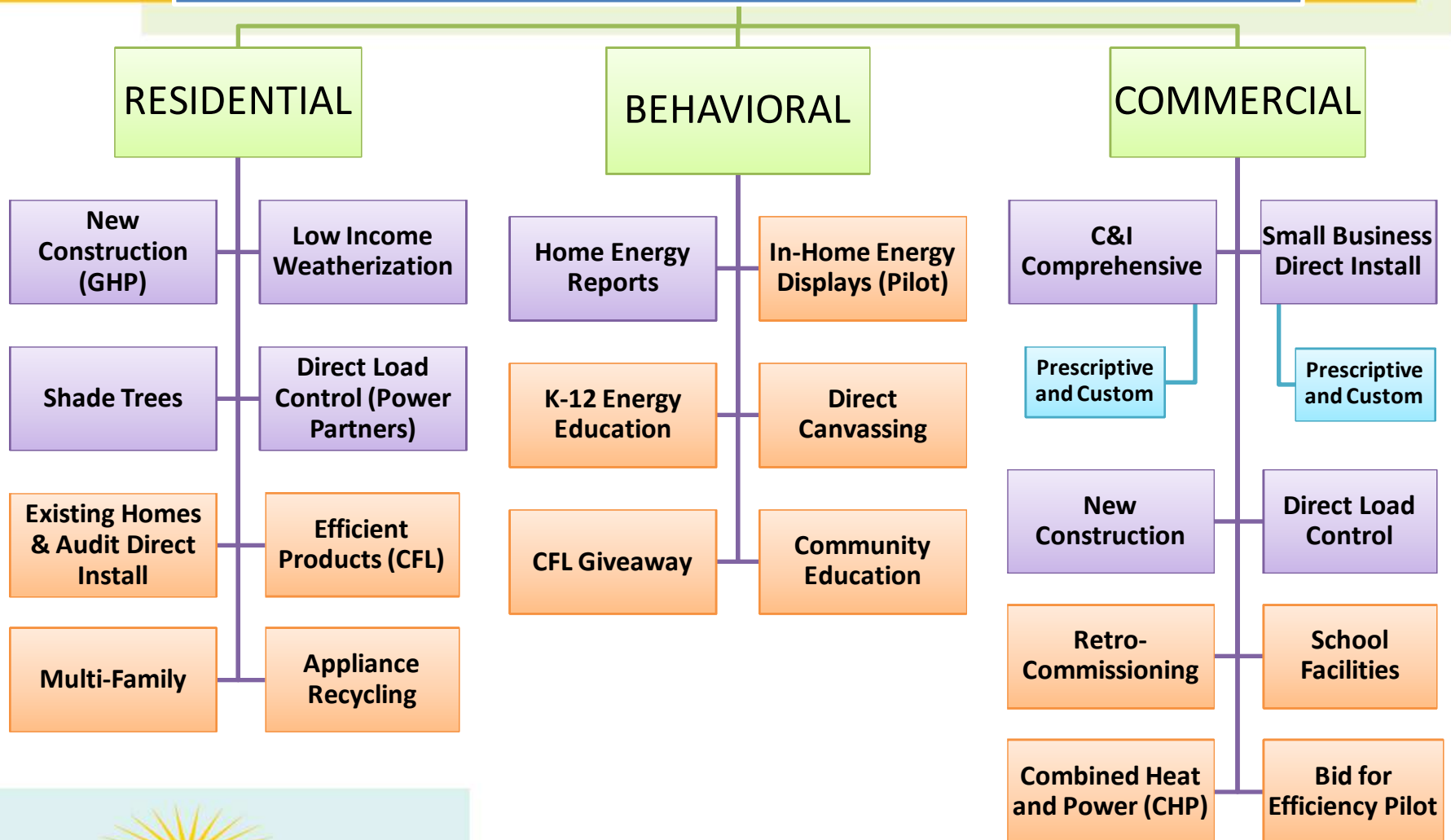


\*

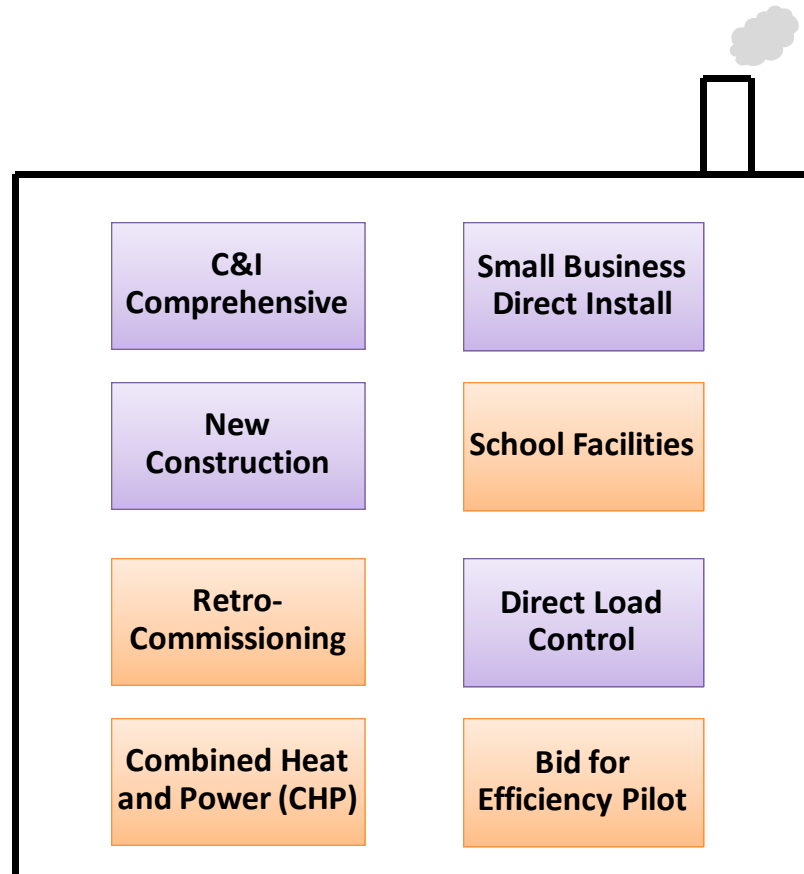


\* Over the life of the program, based on annual consumption of 11,361 kWh of one home and total savings necessary of 2,137 GWh.

# TEP Portfolio



# Commercial Programs



# Commercial Programs

C&I Comprehensive

Small Business DI

School Facilities

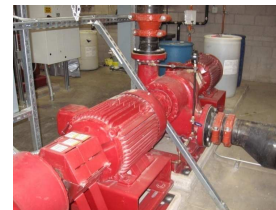
3 programs, 1 concept

Lighting, Motors, Refrigeration,  
Custom Incentives, more....

C&I Comprehensive

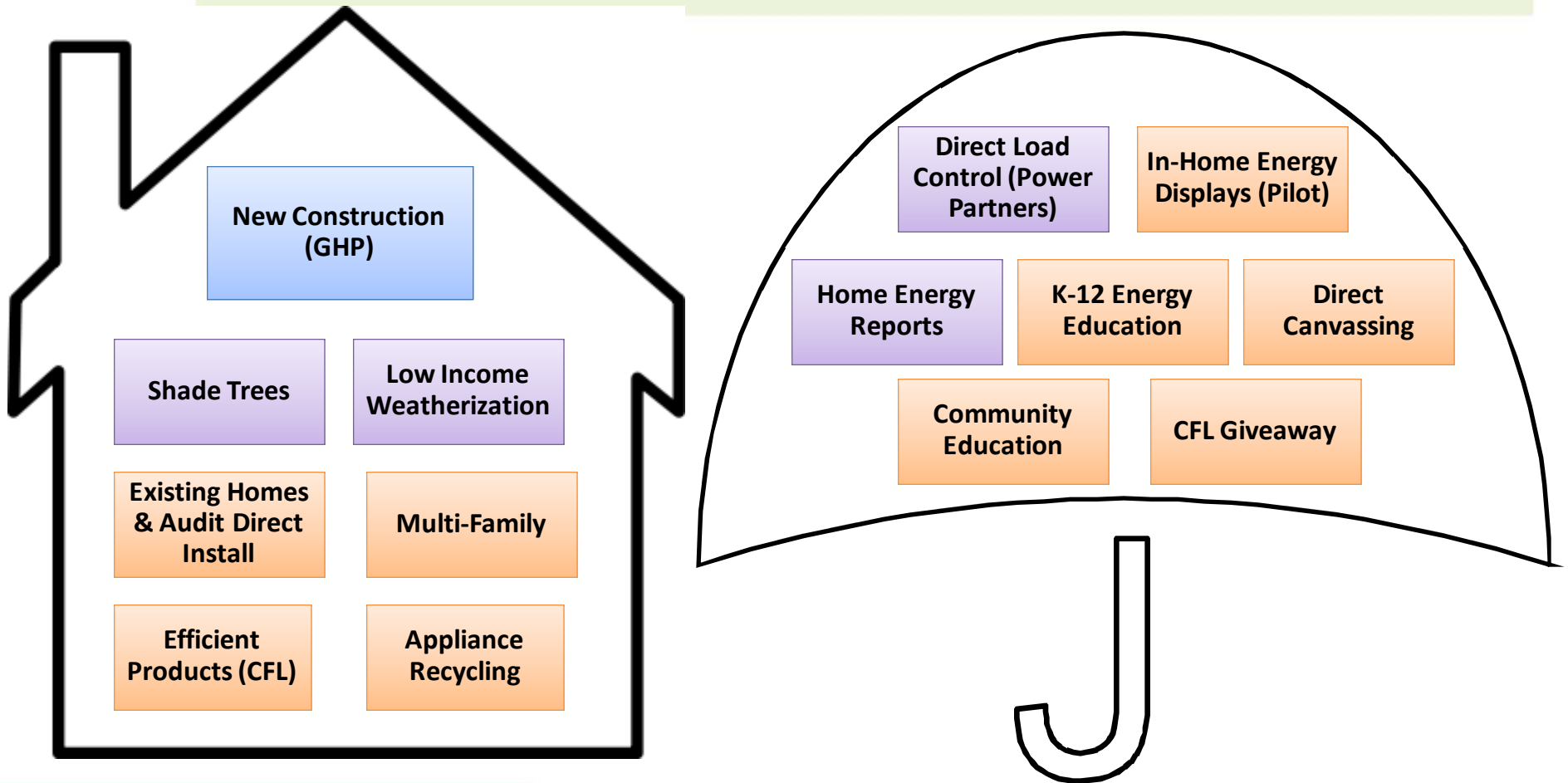
Small Business DI

School Facilities



  
**BRIGHT SOLUTIONS** SM

# Residential & Behavioral Programs





# Low Income Weatherization

Low Income  
Weatherization

Arizona Energy Office + U.S.  
Department of Energy + TEP →  
Weatherization Assistance Program

***Conserves  
energy and  
lowers  
utility bills.***

For homes at  
150% of Federal  
Poverty Line

Over 200  
homes  
weatherized  
each year!

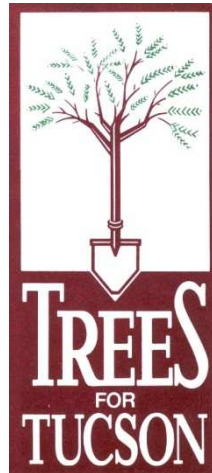
Includes duct repair, pressure  
management, attic insulation, and  
repair/replacement of non-functional or  
hazardous appliances.

# Shade Trees

Shade Trees

 **TUCSON  
CLEAN &  
BEAUTIFUL INC.**

  
A UniSource Energy Company



64,000

X



  
**BRIGHT SOLUTIONS**<sup>SM</sup>

# What is the Existing Home Program?

A program designed to bring the **building science** and **energy efficiency** of the Guarantee program to Existing Homes...

Existing Homes &  
Audit Direct Install

Making them **safer, more comfortable,** and **more affordable** to run.



# Existing Homes/Audit Direct Install

## *Building Science using Whole House Approach*



NEW CONSTRUCTION

REMODEL

EXISTING HOMES & AUDIT DIRECT INSTALL

EXISTING HOMES & AUDIT DIRECT INSTALL

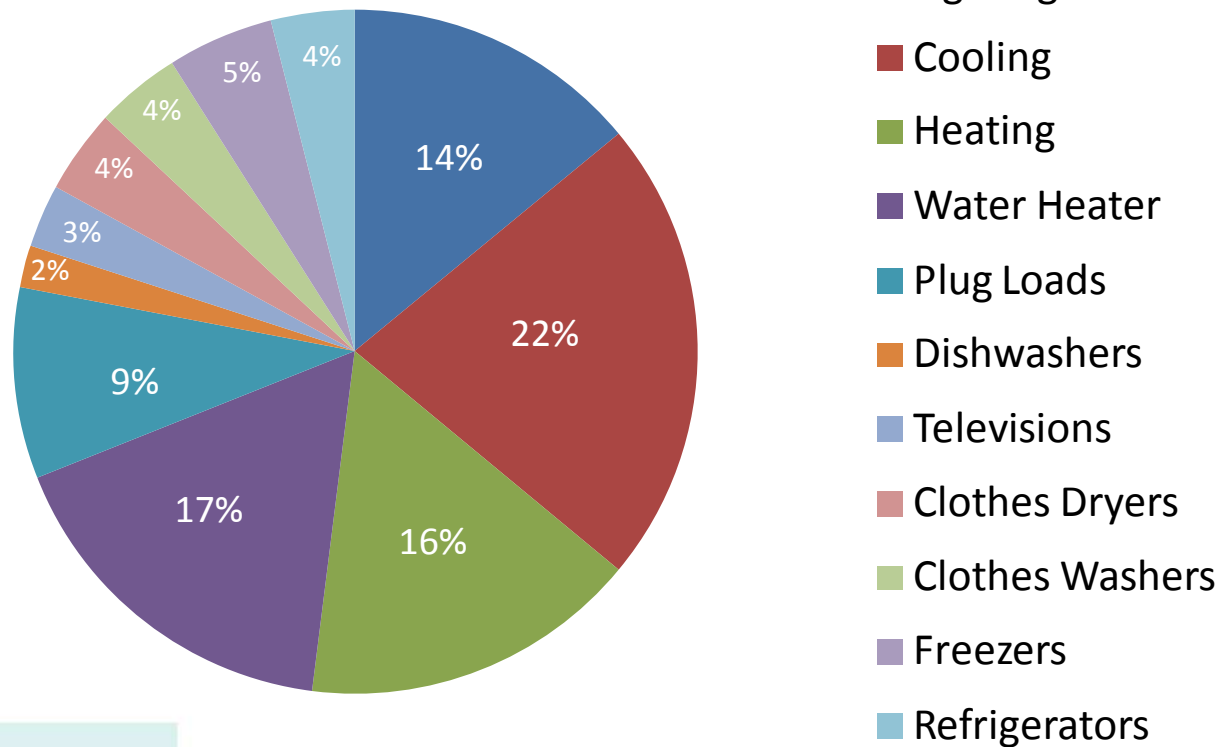
REMODEL

NEW CONSTRUCTION

REMODEL

# Existing Homes/Audit Direct Install

*Average Energy Consumption of Tucson Home*

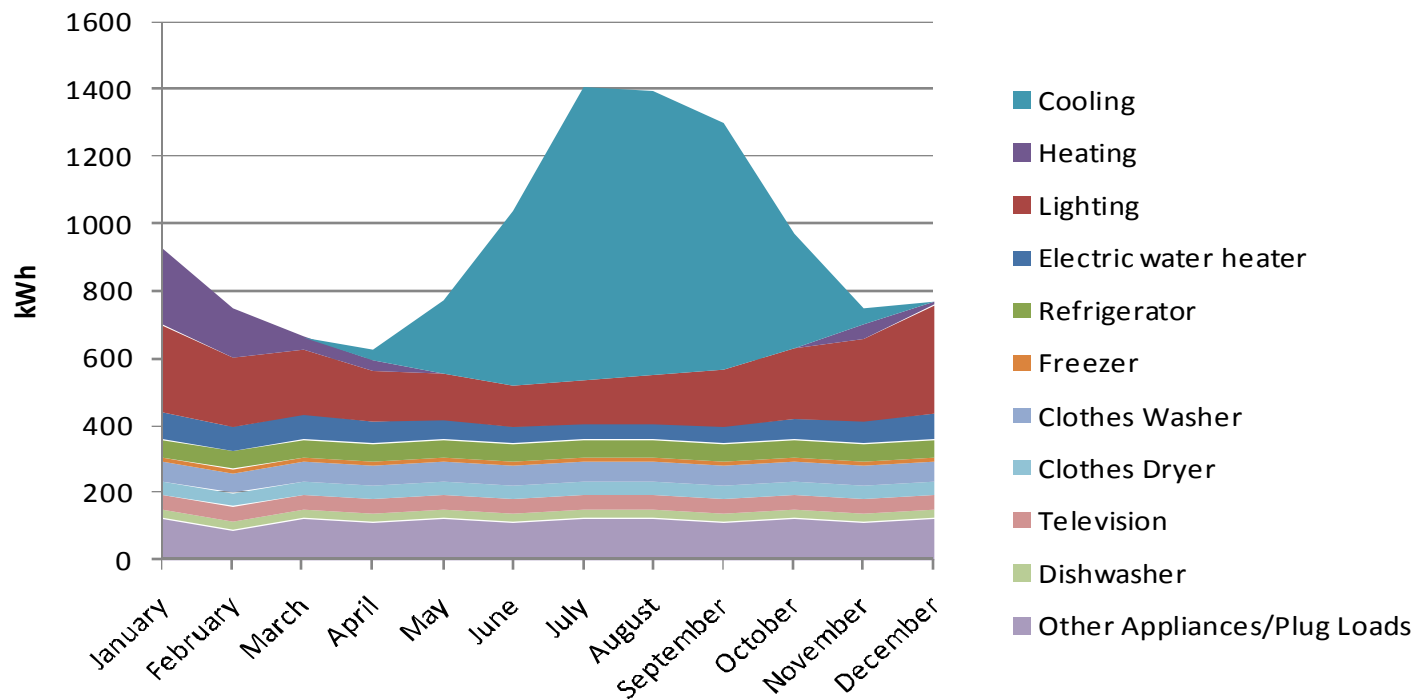


Existing Homes &  
Audit Direct Install



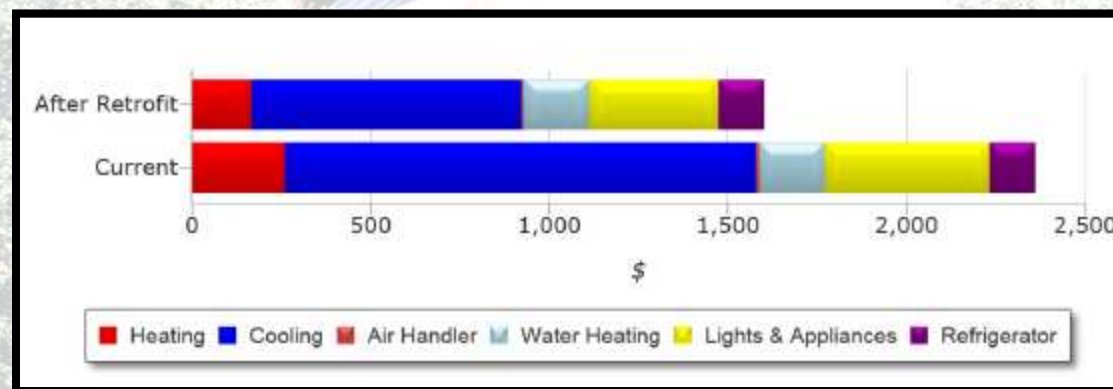
# Existing Homes/Audit Direct Install

***Average Residential Energy Consumption By Month***



# Existing Homes/Audit Direct Install

## Home Audit Analysis and Recommendations



| Description                       | Est. Cost | Est. Incentive | Your Cost | Est. Annual Savings | Est. Payback Years w/ Incentives |
|-----------------------------------|-----------|----------------|-----------|---------------------|----------------------------------|
| Attic Floor Open Blow Cellulose 3 | \$960     | \$500          | \$400     | \$230               | 4.19                             |
| Shade Screen                      | \$300     | \$200          | \$100     | \$400               | 0.72                             |
| Air Sealing                       | \$75      | \$35           | \$40      | \$7                 | 10.18                            |
| Ten 13W CFL Bulbs                 | \$0       | \$0            | \$0       | \$100               | 0.00                             |

# Energy Efficiency Financing

## Supports Existing Homes Program

- Financing for all ACC-approved measures
- UNS Loan loss revenue and Interest rate buy down
- \$2M loan value for TEP, \$1M Loan value for UNSE



## Qualifications

- 640 FICO Score
- 50% Debt to Income Ratio
- 12-yr Max Loan Term up to \$15,000





# Power Partners Project - DLC

## Power Partners

Energy  
Audit

Energy  
Efficiency  
Program

Energy  
Efficiency  
Program

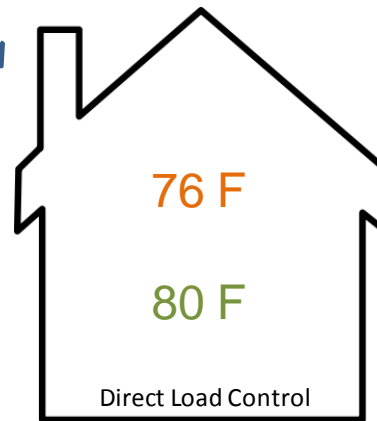
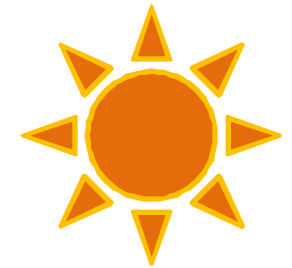
Energy  
Efficiency  
Program

Energy  
Efficiency  
Program

TE-N-DRIL™  
The Power is Yours



A UniSource Energy Company



# Power Partners Project – Displays

## Power Partners

Smart Meter  
Program

Smart  
Appliances

Community  
Initiative

Grid Modernizing

Grid Overlay

TE<sup>N</sup>DRIL™  
The Power is Yours



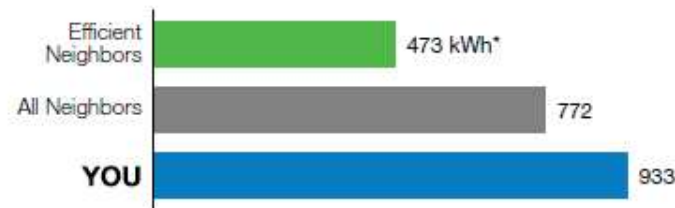
[ In-Home Energy Display ]

  
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# Home Energy Reports

OPower

## Last Month Neighbor Comparison | You used **21% MORE** electricity than your neighbors.



\* kWh: A 100-Watt bulb burning for 10 hours uses 1 kilowatt-hour.

How you're doing:

You used more  
than average

Turn over for ways to save



### Who are your Neighbors?

#### All Neighbors

Approximately 100 occupied, nearby homes that are similar in size to yours (avg 1,351 sq ft)

#### Efficient Neighbors

The most efficient 20 percent from the "All Neighbors" group

# K-12 Energy Education

environmental  
education  
exchange

environmental  
education  
exchange

K-12 Energy  
Education

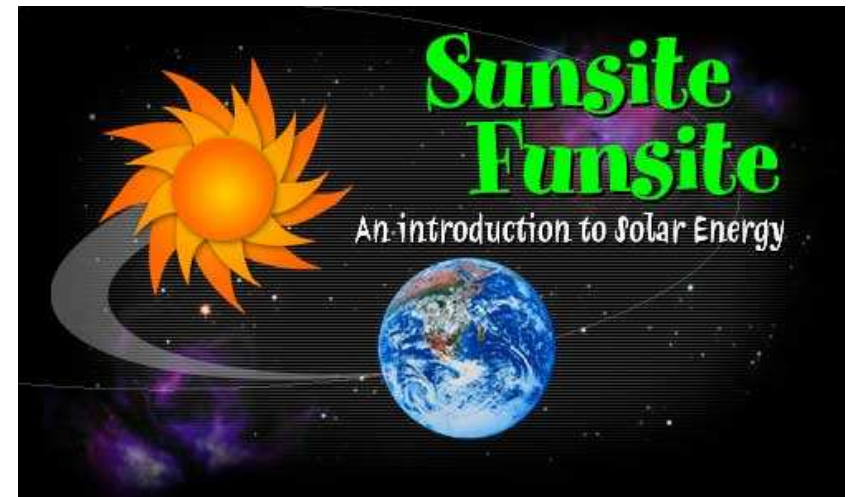
environmental  
education  
exchange

environmental  
education  
exchange

environmental  
education  
exchange



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First web-interactive tool for Tucson students to learn about solar and photovoltaic technology.



# Community Education



A UniSource Energy Company

Train the Trainer



Energy-Saving Kits.



# Direct Canvassing

What is it?

How to do it

Why do it?

How to do it

Direct Canvassing

Q1 Overview



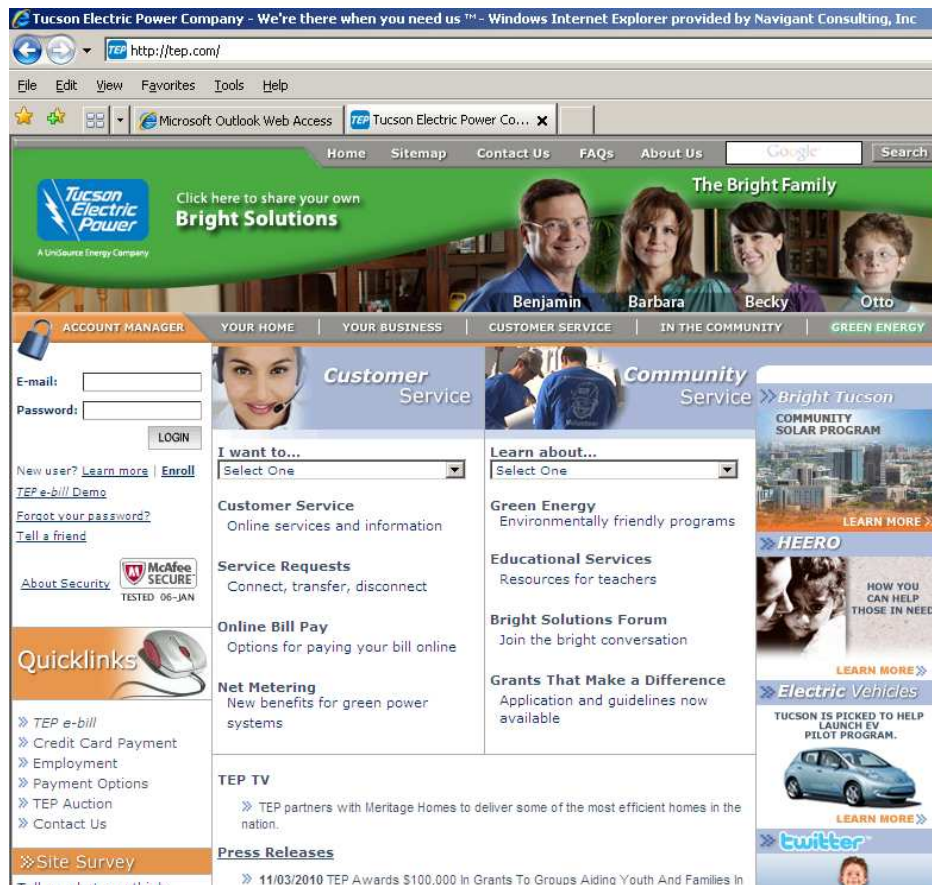
 **ONECHANGE**  
Simple actions matter.™



 **BRIGHT SOLUTIONS** SM



# Thank You!



Visit us at [www.tep.com](http://www.tep.com)  
for more information  
about current and  
upcoming programs.

Contact us at  
(520) 918 8346.

Thank you!

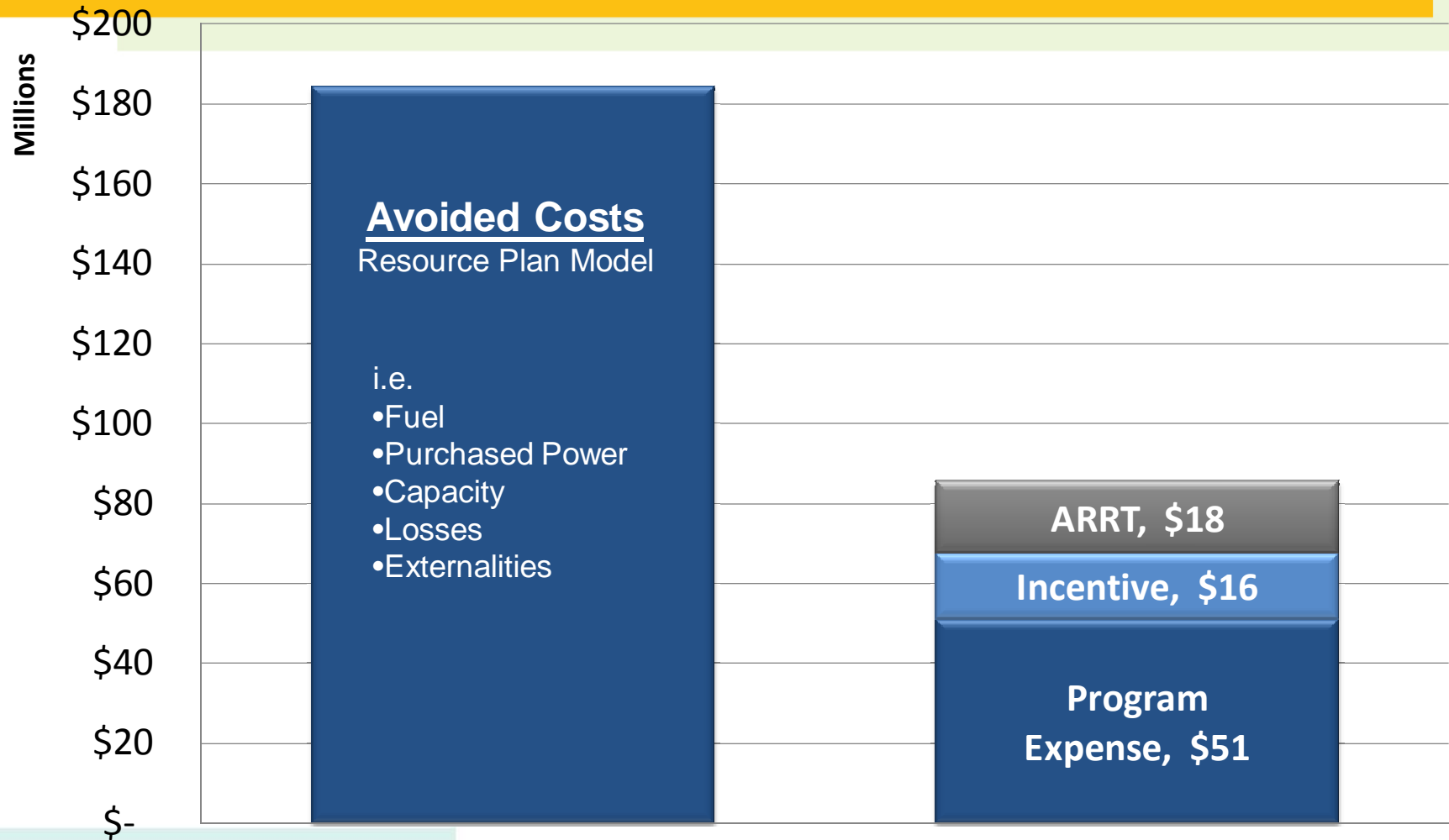


# Questions

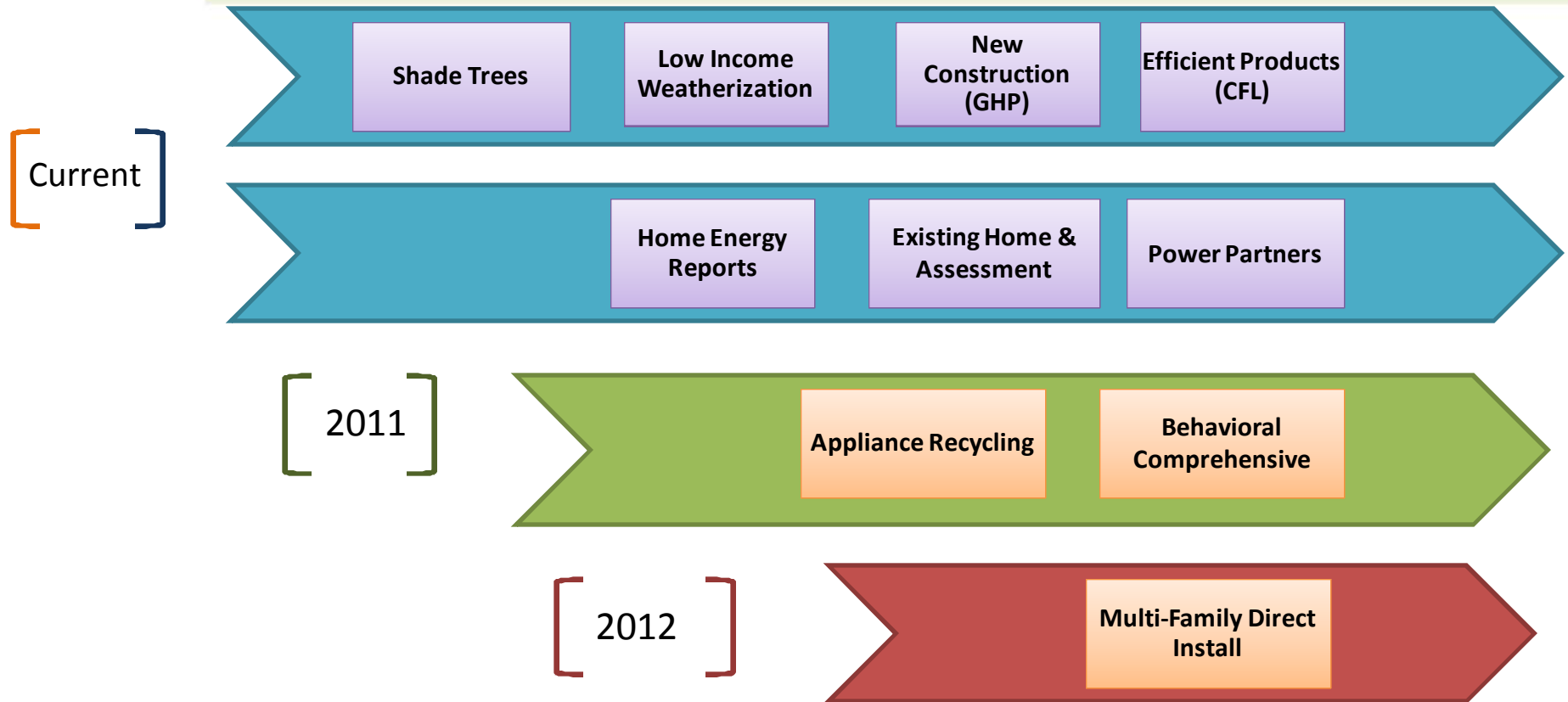




# Benefits and Costs (2011 & 2012)



# Residential Program Timeline



# Commercial Program Timeline

[Current]

C&I Comprehensive

Small Business DI

New Construction

Direct Load  
Control

[2011]

Bid for Efficiency

Combined Heat &  
Power

[2012]

Schools

Retro-  
Commissioning

# Direct Install Programs

C&I Comprehensive

Small Business DI

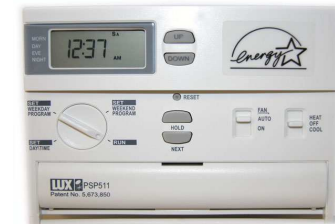
School Facilities

3 programs, 1 concept

C&I Comprehensive

Small Business DI

School Facilities



Over 50 new measures combined

# Direct Install - Lighting

C&I Comprehensive

Small Business DI

School Facilities

New Construction

Renovated Buildings

Bid for Efficiency

Construction Phase 1  
Phase 2

Energy  
Capital Savings

Not just



But also



# Direct Install - Refrigeration

C&I Comprehensive

Small Business DI

School Facilities

Not just



But also



# Direct Install - HVAC

C&I Comprehensive

Small Business DI

School Facilities

Not just



But also





# Direct Install - Motors

C&I Comprehensive

Small Business DI

School Facilities

Industrial & Commercial

Industrial & Commercial

Industrial & Commercial

Industrial & Commercial

Industrial & Commercial





# Commercial New Construction



[ Design Assistance ]

[ Energy Design  
Information Resources ]

[ Performance Rebates ]



# Direct Load Control

|                         |
|-------------------------|
| 1.0 Introduction        |
| 2.0 Overview            |
| 3.0 Goals               |
| 4.0 Program Description |
| 5.0 Program Details     |
| 6.0 Direct Load Control |
| 7.0 Program Efficiency  |
| 8.0 Program Results     |
| 9.0 Program Summary     |

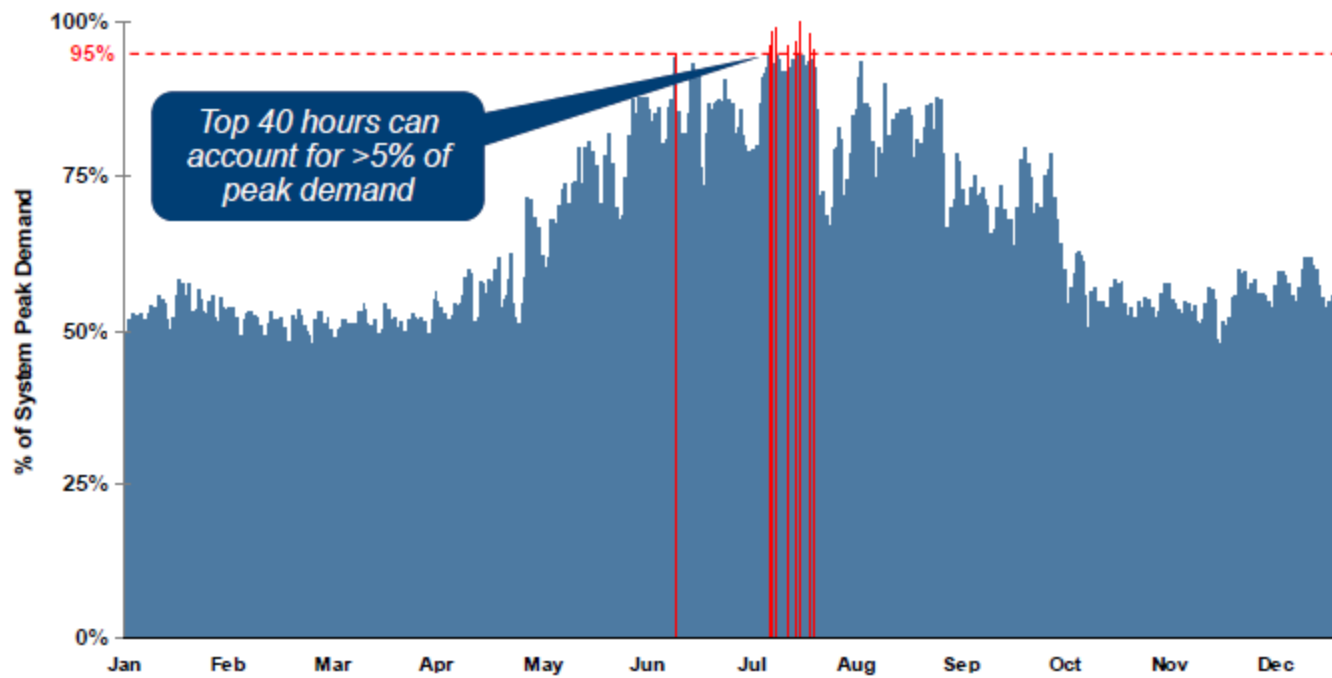


A UniSource Energy Company



# Direct Load Control

*Tucson Electric Load Profile*



Demand Response avoids the need to spend 5% of capital on .5% of capacity.

# Bid for Efficiency

***Submit Your  
Company's  
Energy Efficiency  
Idea to TEP.***

Bid for Efficiency

1. **High-Performance Engines**  
 2. **Advanced Turbines**  
 3. **Hydrogen Fuel Cells**  
 4. **Advanced Batteries**  
 5. **Renewable Energy Integration**  
 6. **Smart Grids**  
 7. **Energy Storage Solutions**  
 8. **Efficient Heat Exchangers**  
 9. **Advanced Materials**  
 10. **AI and Machine Learning**  
 11. **Carbon Capture and Storage**  
 12. **Advanced Sensors**  
 13. **Energy Efficiency Standards**  
 14. **Renewable Energy Storage**  
 15. **Advanced Power Electronics**  
 16. **Energy Efficiency Audits**  
 17. **Advanced Control Systems**  
 18. **Energy Efficiency Regulations**  
 19. **Advanced Manufacturing**  
 20. **Energy Efficiency Certifications**  
 21. **Advanced Energy Storage**  
 22. **Energy Efficiency Incentives**  
 23. **Advanced Energy Conversion**  
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## Combined Heat & Power



# Retro-Commissioning

Call Center Efficiency

Customer Satisfaction

Service Quality

Operational Efficiency

Energy Efficiency

Bid for Efficiency

Energy Efficiency

Retro-  
Commissioning



Make old equipment  
function like new.